CLAIM AMENDMENTS

1. (Previously Presented) A micro-cantilever device comprising:

a base section;

a cantilever section having a length and a tapered width along the length, the cantilever section connected to the base section, the tapered width a function of position along the length and having a minimum width at the base section.

2. (Previously Presented) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

3. (Previously Presented) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax^2$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

4. (Previously Presented) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax^3$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

5. (Previously Presented) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0*\exp(ax)$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

6. (Previously Presented) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax + bx^2$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, b is a second coefficient and x is a position along the length of the cantilever section.

7. (Previously Presented) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax + bx^2 + cx^3$, wherein w_0 is an initial width of the

cantilever section proximate the base section, a is a coefficient, b is a second coefficient, c is a third coefficient, and x is a position along the length of the cantilever section.

8. (Original) The micro-cantilever device of claim 1 further comprising a ground plane below a portion of the cantilever section.

9. (Original) The micro-cantilever device of claim 1 wherein the micro-cantilever has a pull-in voltage that is calculated as function of dimensions of the cantilever section and material properties of the cantilever section.

10. (Previously Presented) The micro-cantilever device of claim 9 wherein the function is substantially defined by $V_{PI} = 1.5X10^{-12} a^{-0.2009} L^{-2.1899} w_0^{0.2166} \sqrt{E}$, wherein V_{PI} is the pull-in voltage, a is a slope of the tapered width, L is the length, and E is the Young's modulus.

11. (Previously Presented) The micro-cantilever device of claim 9 wherein the function is substantially defined by $V_{PI} = 3.2626X10^{-13} a^{(-0.3385+76.4667L)} L^{-2.8044} w_0^{0.3219} \sqrt{E}$, wherein V_{PI} is the pull-in voltage, a is a taper coefficient, L is the length, and E is the Young's modulus.

12. (Previously Presented) The micro-cantilever device of claim 9 wherein the function is substantially defined by $V_{PI} = 1.0021x10^{-11} \sqrt{E} L^{-1.7868} \exp[a(1.01469x10^{-5} - 0.4221L)]$, wherein V_{PI} is the pull-in voltage, a is a taper coefficient, L is the length, and E is the Young's modulus.

13. (Original) The micro-cantilever device of claim 9 wherein the function is derived by performing the steps of:

determining a geometry of the micro-cantilever device;

determining a plurality of pull-in voltages for at least one length of the micro-cantilever device; and

fitting a pull-in voltage formula to the plurality of pull-in voltages based upon the geometry of the micro-cantilever device.

14. (Original) The micro-cantilever device of claim 13 further comprising the step of assuming a form of the pull-in voltage formula.

15. (Previously Presented) The micro-cantilever device of claim 14 wherein the form of the pull-in voltage is $V_{PI} = ka^x w_0^y L^z$ if the micro-cantilever device has one of a linear tapered width and a parabolic tapered width, wherein V_{PI} is the pull-in voltage, k is a constant, a is a slope of the tapered width, and L is the length.

16. (Previously Presented) The micro-cantilever device of claim 14 wherein the form of the pull-in voltage is $V_{PI} = ke^{\alpha x} L^y$ if the micro-cantilever device has an exponential tapered width, wherein V_{PI} is the pull-in voltage, k is a constant, a is a taper coefficient, and L is the length.

17. (Original) The micro-cantilever device of claim 1 wherein the cantilever section has at least one open window.

18. (Original) The micro-cantilever device of claim 17 wherein the micro-cantilever device has an axis about which the micro-cantilever device is symmetrical and wherein the at least one open window is located on the axis.

19. (Original) The micro-cantilever device of claim 1 further comprising a second base section and wherein the cantilever section is attached to the second base section.

20. (Original) The micro-cantilever device of claim 19 further comprising a ground plane located below the cantilever section.

21. (Original) The micro-cantilever device of claim 19 wherein the cantilever section has at least one open window.

22. (Original) The micro-cantilever device of claim 19 further comprising a strain relief at at least one of the base section and second base section.

23. (Original) The micro-cantilever device of claim 19 wherein the cantilever section includes a lateral stress relief.

24. (Original) The micro-cantilever device of claim 1 wherein the micro-cantilever device is manufactured using a Multi-User Micro-Electro-Mechanical Systems Process.

25. (Original) The micro-cantilever device of claim 1 wherein the tapered width is a function of position along the length and one of a sinusoidal function, a stepped function, and a trapezoidal function.

26. (Currently Amended) A method to determine a pull-in voltage formula <u>of a micro-cantilever device</u> comprising the steps of:

determining a geometry of the micro-cantilever device;

determining a plurality of pull-in voltages for a plurality of lengths of the micro-cantilever device; and

fitting a pull-in voltage formula to the plurality of pull-in voltages based upon the geometry of the micro-cantilever device.

27. (Original) The micro-cantilever device of claim 26 further comprising the step of assuming a form of the pull-in voltage formula.

28. (Previously Presented) The micro-cantilever device of claim 27 wherein the form of the pull-in voltage is $V_{PI} = ka^x w_0^y L^z$ if the micro-cantilever device has one of a linear tapered width and a parabolic tapered width, wherein V_{PI} is the pull-in voltage, k is a constant, a is a slope of the tapered width, and L is the length.

29. (Previously Presented) The micro-cantilever device of claim 27 wherein the form of the pull-in voltage is $V_{PI} = ke^{ax} L^y$ if the micro-cantilever device has an exponential tapered width, wherein V_{PI} is the pull-in voltage, k is a constant, a is a taper coefficient, and L is the length.

30. (Original) The method of claim 26 wherein the step of determining a plurality of pull-in voltages for a plurality of lengths of the micro-cantilever device comprises the steps of:

a) iteratively solving a displacement vector as a function of applied voltage across the micro-cantilever device;

b) determining a voltage at which a solution of the displacement vector does not converge;

c) setting a pull-in voltage to the voltage at which the solution did not converge; and

d) repeating steps a-c for a number of slope constants.

31. (Original) The method of claim 30 further comprising the step of repeating steps a-d for each length.